

CONTENTS

vii List of participants

L. TOMMASINO, G. BARONI,
G. CAMPOS-VENUTI and
S. A. DURRANI

1 Editorial

INTRODUCTORY SESSION

CHAIRMAN: G. CAMPOS-VENUTI

Invited Paper

P. B. PRICE and M. H. SALAMON

5 Advances in solid state nuclear track detectors

SESSION I: FUNDAMENTAL MECHANISMS OF TRACK FORMATION

CHAIRMAN: G. CAMPOS-VENUTI

R. KATZ, D. E. DUNN and
G. L. SINCLAIR

21 Thindown

J. L. TEYSSIER, J. L. DECOSSAS
and J. C. VAREILLE

25 Radial dimensions of ion latent tracks in polymers

C. PERRON and M. BOUROT-DENISE

29 Heavy ion track etch rate measurements and track structure in a mineral

U. HEYNA, W. ENGE,
G. SERMUND and R. BEAUJEAN

33 Measurements of transversal etching rates of uranium tracks in CR-39

S. A. R. AL-NAJJAR and S. A. DURRANI

37 Interpretation of Mason's equation in terms of measurable electrochemical-etching parameters governing the dielectric breakdown phenomenon

CUI HUANHUA, WANG SHICHENG
and WU RISHENG

43 Etching behaviour of light particle tracks in CA SSNTD

SESSION II: DETECTOR TECHNIQUES

II. 1. Advanced detectors and new detectors

CHAIRMAN: G. BARONI

Invited Paper

H. ING

49 The status of the bubble-damage polymer detector

M. FUJII and R. YOKOTA

55 Thermosetting resins for nuclear track detection

J. STEJNY and T. PORTWOOD

59 A novel "rapid development" plastic track detector

S. A. R. AL-NAJJAR, A. ABDEL-NABY
H. AFARIDEH and S. A. DURRANI

63 New methods of sample-preparation and readout for the scintillator technique of etched-track counting of plastic detectors

M. FANTINI

69 Advances in the quality and applications of cellulose nitrate detectors

E. SCHOPPER, TH. WENDNAGEL,
B. BAICAN and J. U. SCHOTT

71 Advancement with AgCl-track detectors

S. P. TRETYAKOVA, V. V. SHIRKOVA
N. B. KHITROVA and C. BORCEA

75 Polyvinylidenefluoride (PVF) as a charged particle detector

SESSION II: DETECTOR TECHNIQUES

II. 2. Detector processing

CHAIRMAN: R. V. GRIFFITH

E. V. BENTON, K. OGURA,
A. L. FRANK, T. M. ATALLAH
and V. ROWE

79 Response of different types of CR-39 to energetic ions

A. L. FRANK, K. OGURA
and E. V. BENTON

T. HEINS and W. ENGE

M. BETH, W. ENGE and G. SERMUND

G. SOMOGYI, M. TÓTH-SZILÁGYI
I. HUNYADI and A.-F. HAFEZ

D. L. HENSHAW, T. PORTWOOD
and A. P. FEWS

T. PORTWOOD and D. L. HENSHAW

T. PORTWOOD, D. L. HENSHAW
and J. STEJNY

T. PORTWOOD and J. STEJNY

T. PORTWOOD and J. STEJNY

J. STEJNY and T. PORTWOOD

M. ZAMANI, D. SAMPSONIDIS
and S. CHARALAMBOUS

S. KUMAR, S. CHANDER,
J. S. YADAV and A. P. SHARMA

J. B. HOMER and J. C. H. MILES

B. STILLER, J. H. ADAMS, JR
and L. P. BEAHM

M. ZAMANI, E. SAVVIDES,
J. PETRAKIS and S. CHARALAMBOUS

E. SAVVIDES, M. CHRISTODOULOU
M. ZAMANI and S. CHARALAMBOUS

M. SOHRABI and SH. MAHDI

R. BENDERAĆ, D. GLIŠOVIĆ,
R. ANTANASIJEVIĆ, J. VUKOVIĆ
and Ž. TODOROVIĆ

CHING-SHEN SU

A. SAXENA and K. K. DWIVEDI

83 Fading of latent tracks in CR-39 due to environmental conditions

87 Oxygen effect on the etch rate in CR-39 plastic detector

91 Some new aspects on etching of CR-39 plastic detector

97 Effect of certain production parameters and post-production treat-
ments on the etching characteristics of CR-39 sheets

101 Anomalous track and bulk etching characteristics of CR-39

105 The effect of gamma dose on the alpha response of CR-39

109 Ageing effects in CR-39

113 Polymerization kinetics of CR-39 by FTIR

117 Computer simulation of polymerizing CR-39

121 A study of the molecular structure in CR-39

125 Dose rate effects on CR-39 SSNT detector

129 Some environmental effect studies on the response of CR-39(DOP)
plastic track detector

133 The effects of heat and humidity before, during and after exposure
on the response of PADC (CR-39) to alpha particles

137 Ultraviolet enhancement of tracks in Lexan with black light
fluorescent lamps

141 Gamma dose discrimination properties of SSNT detectors

145 Temperature effects on registration properties of CN-85

149 Background heat treatment studies in LR-115

153 Water effect on sensitivity and tracks regression on SSNTD

157 A study of changing etching condition of LR-115 after the high
neutron flux irradiation in a nuclear reactor

161 Chemical etching characteristics of glass detectors

SESSION II: DETECTOR TECHNIQUES

II. 2. Detector processing (continued)

CHAIRMAN: D. O'SULLIVAN

M. ZAMANI, S. JOKIC,
F. FERNÁNDEZ, M. DEBEAUVAIS
and J. RALAROSY

M. SOHRABI and GH. ZAINALI

M. SOHRABI and M. KHOSHNOODI

M. SOHRABI

D. E. HADLOCK, M. A. PARKHURST,
C. S. YANG, J. GROEGER,
J. F. JOHNSON and S. J. HUANG

167 A study of electrochemical etched alpha and proton tracks in
CR-39 as function of energy

171 Broadening registration energy range of alpha tracks in CR-39
under a new ECE condition

175 The effects of pre-etching time on the characteristic responses of
electrochemically etched CR-39 neutron dosimeters

179 Discovery of an "internal heating effect" during electrochemical
etching of polymeric dosimeters: a study of polymer characteristics

185 Electrochemical development of particle tracks in CR-39 polymer
dosimeters

- M. A. EL-FIKI, M. A. FADEL,
M. A. SHARAF, N. RABIE
and G. M. HASSIB
- M. F. CESAR and M. A. R. FRANCO
- LI XIANGBAO
- LI BOYANG
- A. ABDEL NABY, J. PÁLFALVI
and S. A. DURRANI
- S. A. DURRANI and S. A. R. AL-NAJJAR
- 189 Optimization of ECE of CR-39 and Makrofol-E at frequencies up to 1 MHz
- 193 Some studies on the registration of particles on Makrofol E
- 197 Study on the relation between relative sensitivity of CR-39 and electric field strength in electrochemical etching
- 201 On the formation of tree track in foil CR-39
- 205 Alpha-particle spectrometry with CR-39 using combined chemical and electrochemical etching
- 211 The relationship between the pre-etched track length and the ECE track-spot size

SESSION II: DETECTOR TECHNIQUES

II. 3. Measurement methods and apparatus

CHAIRMAN: D. O'SULLIVAN

- A. P. FEWS
- A. P. FEWS
- A. K. MOHANTY, K. N. IYENGAR
and N. N. AJITANAND
- R. CASACCIA, I. LAAKSO and
S. RISICA
- G. ESPINOSA, J. I. GOLZARRI,
I. GAMBOA, L. TOMMASINO and
R. V. GRIFFITH
- K. K. DWIVEDI, A. SAXENA,
P. CROMBACH, E. REICHWEIN
and G. FIEDLER
- I. J. M. AL-KHALIFA and J. V. MAJOR
- S. AOKI, K. CIBA, H. FUCHI,
K. HOSHINO, M. ICHIMI,
K. KODAMA, M. MIYANISHI,
M. NAKAMURA, Y. NAKAMURA,
K. NAKAZAWA, K. NIU,
K. NIWA, M. OHASHI,
S. SASAKI, H. SHIBUYA,
S. TASAKA, N. TORII, Y. YAMAKAWA
and Y. YANAGISAWA
- V. BISI, D. CROSETTO, D. GAMBA,
A. MARZARI CHIESA and C. PESCE
- E. GANSSAUGE, B. DRESSEL,
H. KALLIES, CH. MÜLLER and
W. SCHULZ
- J. DREUTE, W. TRAKOWSKI,
B. SCHÖFER, C. BRECHTMANN,
H. DRECHSEL, H. EVERSBERG,
W. FRICKE, J. BEER,
B. WIEGEL and W. HEINRICH
- H. G. BAUMGARDT, W. AMEND,
R. STAUDTE and E. SCHOPPER
- 217 A flexible technique for the analysis of etched tracks in CR-39 plastic
- 221 Fully automated image analysis of alpha particle and proton etched tracks in CR-39
- 227 Automatic scanning of enlarged fission tracks in Lexan polycarbonate
- 231 Automatic track acquisition with the Frascati PEPR
- 235 Digital image counting system for nuclear track detectors
- 241 Track lengths of heavy ions in CR-39 and ZnP-glass detectors
- 245 Simulations of fission track distributions in apatite
- 249 Computer aided emulsion analysis system to study events with production cross section of nano barn
- 253 Automatized microscope for nuclear emulsion measurements
- 257 Measurements of nuclear emulsion tracks by means of a picture analysis system
- 261 The Siegen automatic measuring system for nuclear track detectors—status and new developments
- 265 A computerized video-electronic device for particle track measurements

SESSION II: DETECTOR TECHNIQUES

II. 3. Measurement methods and apparatus (continued)

CHAIRMAN: R. KATZ

- | | | |
|--|-----|--|
| E. M. STADERINI and A. CASTELLANO | 271 | Automatic track counting with an optic RAM-based instrument |
| L. TOMMASINO, D. E. CHEROUATI
and F. RAPONI | 275 | Improvements in the spark-replica counter and the breakdown counter |
| G. INGRAO, A. S. PASCHOA,
R. M. HOLT-MCFARLAND,
F. W. WILLIAMS and M. E. WRENN | 279 | Cross calibration of independently built spark chambers |
| M. BALCAZAR, J. L. SEIDEL and
M. MONNIN | 283 | Alpha particles spectroscopy using a magnetic spectrograph and a large S.S.N.T.D. spark counter |
| S. R. HASHEMI-NEZHAD and
F. NAMI | 287 | A photomultiplier-based track counting system |
| F. FERNÁNDEZ, S. JOKIC,
C. BAIXERAS, M. ZAMANI,
M. DEBEAUVAIS and J. RALAROSY | 291 | A comparative study of methods to determine the alpha-particle track density in different SSNT detectors |
| A. DAMKJAER | 295 | The efficiency of cellulose nitrate LR-115 II for alpha particle detection |
| L. MEDVECZKY, M. NAGY and
G. SOMOGYI | 299 | Nuclear track detector kit for use in teaching |
| CHING-SHEN SU | 303 | Determination of ion beam cross sections by solid state nuclear track detectors |
| R. HENKE, K. OGURA and
E. V. BENTON | 307 | Standard method for measurement of bulk etch in CR-39 |

SESSION III: APPLICATION TO PHYSICS

III. 1. Nuclear physics

CHAIRMAN: E. CASNATI

- | | | |
|---|-----|--|
| D. N. POENARU, M. IVAȘCU
and W. GREINER | 313 | Half lives for spontaneous emission of heavy ions from atomic nuclei |
| R. N. SAGAIK and S. P. TRETYAKOVA | 317 | Use of polycarbonate detectors for spectrometry of fission fragments |
| M. ZAMANI, J. RALAROSY
and M. DEBEAUVAIS | 321 | Multipronged events issuing from reactions of 14 MeV/nucleon ^{132}Xe on silver and gold targets |
| CHING-SHEN SU | 325 | A study of Li ion scattering from Al target by solid state nuclear track detector |
| W. HEINRICH, H. DRECHSEL,
C. BRECHTMANN and J. DREUTE | 327 | Search for anomalons using plastic nuclear track detectors |
| G. BARONI, A. M. CECCHETTI,
S. DI LIBERTO, A. MANFREDINI,
F. MEDDI, G. ROMANO and
C. SGARBI | 331 | Anomalon search |
| K. N. IYENGAR, R. P. ANAND,
N. N. AJITANAND, D. M. NADKARNI
and A. K. MOHANTY | 333 | Measurement of proton induced fission cross-section of ^{235}U at sub-coulomb barrier energies |
| H. A. KHAN | 337 | Determination of charge (Z)- and Z/β -threshold values for different glass and plastic track detectors |
| H. A. KHAN, M. A. SIAL, F. R. KHAN
S. A. SHEIKH, K. JAMIL, G. HUSSAIN,
A. WAHEED, E. U. KHAN, A. U. KHAN,
Z. ARIF, B. AKHTAR, M. S. ZAFAR,
R. BRANDT and P. VATER | 341 | Study of "8.5 MeV/nucleon $^{208}\text{Pb} + \text{Pb}$ (natural)" interaction using mica track detectors |

- H. A. KHAN, I. E. QURESHI and R. BRANDT
- H. A. KHAN, N. A. KHAN, G. HUSSAIN, F. R. KHAN, M. AHMED and M. A. BAIG
- A. AFRAMIAN and S. GHAHREMANI
- B. GRABEŽ
- C. BRECHTMANN, H. DRECHSEL, J. BEER and W. HEINRICH
- 345 Interaction of energetic uranium ions with ^{165}Ho , ^{184}W , ^{197}Au and ^{209}Bi targets
- 349 Elastic and inelastic scattering of 8.5 MeV/nucleon ^{132}Xe ions by uranium targets
- 353 Production cross sections and charge state spectra of low-Z recoil ions in composite media
- 357 Target fragmentation in high energy nucleus-nucleus collisions investigated by using CR-39 plastic track detector
- 361 Cross sections for the production of fragments with $Z \geq 8$ by fragmentation of $9 \leq Z \leq 26$ nuclei

SESSION III: APPLICATION TO PHYSICS

III. 2. Heavy ions and cosmic rays

CHAIRMAN: E. V. BENTON

- C. PERRON
- J. NAVARRO, F. FERNÁNDEZ, C. BAIXERAS, A. VIDAL-QUADRAS, M. DEBEAUVAIS and J. RALAROSY
- V. P. PERELYGIN, S. G. STETSENKO, O. OTGONSUREN, W. BIRKHOLZ, R. IGNATOVA, G. J. STARODUB, D. HASHEGAN, M. HAIDUC, M. BYTYCI, B. JAKUPI, R. ANTANASJEVIĆ, Z. TODOROVIĆ, R. DERSCH, P. VATER, R. BRANDT, R. SPOHR, P. ARMBRUSTER, D. S. JADAV, A. M. SHARMA, G. KURAT and E. M. FRIEDLANDER
- SHI-LUN GUO, P. B. PRICE and M. L. TINCKNELL
- G. SINGH, S. DEVI, S. SINGH and H. S. VIRK
- J. H. ADAMS, JR and L. P. BEAHM
- A. THOMPSON, D. O'SULLIVAN and C. DOMINGO
- C. DOMINGO, D. O'SULLIVAN and A. THOMPSON
- D. O'SULLIVAN, A. THOMPSON and C. DOMINGO
- A. P. SHARMA, V. P. PERELYGIN and L. L. KASHKAROV
- K. OSCHLIES, R. BEAUJEAN and W. ENGE
- S. BISWAS, R. CHAKRABORTY, R. COWSIK, N. DURGAPRASAD, P. J. KAJAREKAR, R. K. SINGH, M. N. VAHIA, J. S. YADAV, J. N. GOSWAMI, D. LAL, H. S. MAZUMDAR, D. V. SUBHEDAR and M. K. PADMANABHAN
- J. S. YADAV, S. BISWAS and N. DURGAPRASAD
- 367 On heavy ion identification in a mineral track detector
- 371 Etching conditions and resolution power of polymer detectors for ultra-heavy ions
- 375 Track length of very heavy ion tracks in olivines
- 379 Study of relativistic projectile fission with CR-39 plastic stack
- 383 Track etch rate characteristics of Makrofol polycarbonate plastic detector exposed to xenon ions
- 387 The registration temperature effect for lightly ionizing particles in CR-39
- 391 The ionisation dependence of the registration temperature effect in solid state nuclear track detectors
- 395 The influence of etching conditions on the resolving power of Lexan polycarbonate for ultra heavy ions
- 399 The response of Tuffak polycarbonate to high energy xenon, holmium, gold and uranium nuclei
- 403 Comments on the Fe-group track density and track length distribution in different meteoritic and moon crystals
- 407 Measurement of low energy cosmic rays aboard Spacelab-1
- 411 Indian cosmic ray experiment ions (ANURADHA) in space shuttle Spacelab-3 using CR-39 detectors
- 415 Calibration of CR-39 (DOP) detector module for Indian cosmic ray experiment using accelerated beams

J. KRAUSE, R. BEAUJEAN,
E. FISCHER and W. ENGE

A. B. AKOPOVA, M. M. ARUTYUNYAN,
N. V. MAGRADZE, A. A. MOISEENKO,
C. CH. MURADYAN, K. M. HOVNANYAN
V. S. POGOSOV and T. S. CHALABYAN

J. H. ADAMS, JR, L. P. BEAHM
and B. STILLER

G. SERMUND, G. SIEGMON,
W. ENGE, W. R. WEBBER and
G. A. SIMPSON

G. P. HERTZEN and A. M. MARENKY

J. S. YADAV, V. P. PERELYGIN
and S. G. STETSENKO

M. GINJAUME, C. BAIXERAS,
F. FERNÁNDEZ and A. VIDAL-QUADRAS

419 CR-39 used for cosmic ray measurements aboard Spacelab-1

423 On the possibility of charge identification of particles with $Z \geq 2$
by the grain calculation regime in nuclear-emulsions

427 Trapped ions in space experiment

431 Methods of time resolution using plastic detectors in cosmic ray
studies

435 Time-resolution equipment for registration of cosmic rays in solid
state nuclear track detectors

439 Track kinetics of volume tracks in crystals

443 A study of CR-39 resolution power for heavy relativistic cosmic
ions

SESSION III: APPLICATION TO PHYSICS

III. 3. New particles

CHAIRMAN: G. VANDERHAEGE

Invited Paper

J. SACTON

G. GIACOMELLI, L. LEMBO,
A. P. MARGIOTTA, A. MARZARI CHIESA,
P. MUSSET, L. PATRIZII,
G. ROSA and P. SERRA

WA75 COLLABORATION

A. WAHEED

K. HOSHINO and G. ROSA

G. BARONI, S. DELL'UOMO,
S. DI LIBERTO, M. A. MANFREDINI,
M. A. MAZZONI, F. MEDDI,
G. ROMANO and C. SGARBI

449 The use of nuclear emulsion in hybrid detectors for high energy
physics

465 Search for massive monopoles at the Gran Sasso laboratory with
a large scale apparatus made up of scintillation counters, streamer
tubes and CR-39 detectors

469 The first observation of beauty particles in nuclear emulsion

473 The re-emission of K^- meson in the interaction of 1.5 GeV/c K^-
meson with light emulsion nuclei

477 A facility at CERN for pouring the photographic emulsions for
nuclear and particle research

483 Use of nuclear emulsions and digitized microscopes in hybrid
experiments

SESSION IV: APPLICATIONS TO BIOLOGY AND RADIOPROTECTION

IV. 1. Life science and dosimetry of cosmic rays

CHAIRMAN: G. BRIGANTI

A. B. AKOPOVA, V. E. DUDKIN,
O. N. KARPOV, L. V. MELKUMYAN,
YU. V. POTAPOV and SH. B. RSHTUNI

S. R. HASHEMI-NEZHAD and
S. A. DURRANI

N. PETOUSSI and S. A. DURRANI

E. V. BENTON and R. G. RICHMOND

F. SPURNÝ

R. PFOHL, M. DEBEAUVAIS,
J. P. MASSUE and H. BUCKER

489 Determination of cosmic radiation characteristics aboard "Salute-
7" orbital station

493 Charged-particle radiography of insects, using accelerated alpha-
particles and plastic SSNTDs

499 Track registration properties of Lexan and CR-39 for ^{12}C and ^{16}O
ions in the energy range relevant to neutron radiotherapy

505 Applications of nuclear track detectors in space radiation
dosimetry

509 Solid state nuclear track detectors in high energy particle dosimetry

513 Advanced biostack: experiment 1ES027 on Space Lab 1

B. WIEGEL, J. BEER, W. FRICKE,
H. EVERSBERG and W. HEINRICH

B. BAICAN, E. SCHOPPER and J. U. SCHOTT

A. TIDJANI, D. B. ISABELLE,
M. MONNIN, O. QUINTERO,
N. SEGOVIA and M. BALCAZAR-GARCIA

K. OGURA, E. V. BENTON,
A. FRANK and T. ATALLAH

515 Cosmic ray LET-spectra investigated by automatic scanning and measuring of plastic nuclear track detectors

519 AgCl-detectors in space biophysics

523 Boron based experimental techniques

527 Proton response of CR-39

SESSION IV: APPLICATIONS TO BIOLOGY AND RADIOPROTECTION

IV. 2. Neutron dosimetry

CHAIRMAN: G. BUSUOLI

Invited Paper

W. G. CROSS

J. L. DECOSSAS, S. SADAKA,
J. C. VAREILLE, L. MAKOVICKA and
J. L. TEYSSIER

C. S. YANG, C. R. DAVIS,
J. H. GROEGER, S. J. HUANG,
J. F. JOHNSON, D. E. HADLOCK and
M. A. PARKHURST

533 Characteristics of track detectors for personnel neutron dosimetry

543 Theoretical study of the contribution of a radiator to the sensitivity of a rapid neutron dosemeter

547 Structure property correlation for CR-39 polycarbonate in dosimetry

SESSION IV: APPLICATIONS TO BIOLOGY AND RADIOPROTECTION

IV. 2. Neutron dosimetry (continued)

CHAIRMAN: M. PELLICIONI

J. H. ROBERTS, R. GOLD and
C. C. PRESTON

R. GOLD, J. H. ROBERTS,
F. H. RUDDY, C. C. PRESTON,
W. N. McELROY, S. V. RAO,
J. GREENBORG and V. R. FRICKE

S. KRONENBERG, W. L. McLAUGHLIN
and C. R. SIEBENTRITT

P. ŠUJAK

W. BIRKHOLZ and K. FREYER

B. BURGHARDT, E. PIESCH
and M. URBAN

S. RAM and S. K. BOSE

P. LE THANH and A. CHAMBAUDET

F. SPURNÝ, J. M. BORDY,
R. MÉDIONI, G. PORTAL
and K. TUREK

J. C. VAREILLE, S. SADAKA,
J. L. DECOSSAS and J. L. TEYSSIER

M. A. PARKHURST, D. E. HADLOCK
and L. G. FAUST

A. WORLEY, A. P. FEWS,
D. L. HENSHAW, T. PORTWOOD
and T. W. TURNER

J. M. BROCK, A. P. FEWS and
D. L. HENSHAW

553 Measurements of the absolute neutron fluence spectrum emitted at 0° and 90° from the Little-Boy replica

557 Neutron dosimetry in the Three-Mile Island Unit 2 reactor cavity with solid-state track recorders

561 Tissue-equivalent radiochromic waveguide dosimeters for X- and gamma rays and fast neutrons

565 On the use of Kodak LR-115 II B for neutron dosimetry at nuclear power plant

569 Use of SSNTD Kodak BCA 80-15 for thermal neutron flux control

573 Measurement of the neutron dose equivalent component of the natural background using electrochemically etched polycarbonate detector and boron-10 radiator

577 Measurement of fast neutron fluence using nuclear track detector

581 Proton detection and neutron dosimetry with LR-115

585 Development of fast neutron detector for multielement personal neutron track dosemeter

589 Experimental response of a dosemeter (radiator/CR-39) for neutrons in the energy range 100 keV-3 MeV

593 Semi-empirical model of neutron and charged particle interaction with CR-39

597 Background track reduction in the Bristol CR-39 neutron dosimeter

603 An approach to neutron spectrometry based on triton spectroscopy in the ${}^6\text{Li}(n,\alpha){}^3\text{H}$ reaction

G. DAJKÓ and G. SOMOGYI

S. A. R. AL-NAJJAR,
A. ABDEL-NABY and S. A. DURRANI

S. A. DURRANI, A. ABDEL-NABY
H. AFARIDEH and S. A. R. AL-NAJJAR

S. A. DURRANI, H. AFARIDEH,
A. ABDEL-NABY and
S. A. R. AL-NAJJAR

J. R. HARVEY and A. R. WEEKS

L. LEMBO, O. CIVOLANI,
L. PATRIZII and G. LODI

R. W. POLLOCK

607 Fast neutron spectrometry based on proton detection in CR-39 detector

611 Fast-neutron spectrometry using the triple- α reaction in the CR-39 detector

617 The scintillator-filled etch-pit method for neutron dosimetry: Part I—Thermal neutrons, with (n, α) converters

623 The scintillator-filled etch-pit method for neutron dosimetry: Part II—Fast neutrons, using intrinsic tracks

629 A neutron dosimetry system based on the chemical etch of CR-39

633 Improvement on CR-39 manufacturing for neutron dosimetry applications

637 Low-cost imaging system for semi-automatic track counting

SESSION IV: APPLICATIONS TO BIOLOGY AND RADIOPROTECTION

IV. 2. Neutron dosimetry (continued)

CHAIRMAN: E. ROTONDI

D. E. HANKINS, S. G. HOMANN
and J. M. DAVIS

D. T. BARTLETT, J. D. STEELE
and D. R. STUBBERFIELD

W. G. CROSS, A. ARNEJA and
H. ING

K. G. HARRISON, R. M. HAIGH and
R. GOODENOUGH

MATIULLAH and S. A. DURRANI

E. PIESCH and M. URBAN

M. A. EL-FIKI, G. M. HASSIB,
M. A. SHARAF and M. A. FADEL

M. BALCÁZAR, L. TAVERA and
E. BELMONT

G. ZAPPAROLI, L. TOMMASINO,
S. DJEFFAL and A. MAIORANA

641 Personnel neutron dosimetry using hot, low-frequency electrochemical etching

645 Development of a single element neutron personal dosimeter for thermal, epithermal and fast neutrons

649 The response of electrochemically-etched CR-39 to protons of 10 keV to 3 MeV

653 Some studies of the neutron response, background, ageing and fading properties of two different types of CR-39 plastic processed by electrochemical etching

657 A fast-neutron dosimeter with nearly flat dose equivalent response using CR-39 detectors with various combinations of radiators

661 Dosimetric properties of different CR-39 plastics used as neutron recoil track etch detector

665 Some studies on the neutron-induced tracks in Makrofol polycarbonate detector

669 Electrochemical etching and spark counting studies for ^6Li (n, α)T registration in CR-39

675 Additional results with electrochemically etched CR-39 neutron dosimeters

SESSION IV: APPLICATIONS TO BIOLOGY AND RADIOPROTECTION

IV. 3. Radon monitoring

CHAIRMAN: A. SUSANNA

L. TOMMASINO, D. E. CHEROUATI,
J. L. SEIDEL and M. MONNIN

M. URBAN

H. VANMARCKE and A. JANSSENS

A. WAHEED, A. W. SIDDIQUI,
H. A. KHAN, A. SADIQ, S. A. SHEIKH,
M. A. SIAL and A. U. KHAN

A.-F. HAFEZ and G. SOMOGYI

681 A plastic-bag sampler for passive radon monitoring

685 Passive one-element track etch dosimeter for simultaneous measurement of radon, thoron and decay products in air

689 Study of the properties of electrochemically etched α -tracks in a polycarbonate foil used in a radon diffusion chamber

693 Use of rectangular geometry for radon dosimetry

697 Determination of radon and thoron permeability through some plastics by track technique

G. SOMOGYI, A.-F. HAFEZ,
I. HUNYADI and M. TÓTH-SZILÁGYI

M. A. SIAL, K. JAMIL,
S. A. SHEIKH, H. A. KHAN,
D. MOLZAHN, P. VATER and
R. BRANDT

G. M. HASSIB

G. BIGAZZI, J. C. HADLER,
A. L. F. MARQUES and S. R. PAULO

I. MÄKELÄINEN

D. T. BARTLETT, C. W. BROWNE,
P. J. GILVIN, D. W. DIXON and
J. C. H. MILES

J. F. PINEAU

G. SOMOGYI and L. LÉNÁRT

J. C. H. MILES and J. SINNAEVE

M. SINGH, N. P. SINGH, S. SINGH
and H. S. VIRK

P. ANDERSSON

A. RANNOU, L. JEANMAIRE,
G. TYMEN, A. MOUDEN, E. NAOUR,
N. PARMENTIER and H. RENOUARD

G. TYMEN, A. MOUDEN, A. RANNOU,
C. MADELMONT and N. PARMENTIER

S. HERTZMAN and C. SAMUELSSON

G. JÖNSSON

B. MAJBORN

G. ESPINOSA, J. I. GOLZARRI,
I. GAMBOA and I. JACOBSON

701 Measurement of exhalation and diffusion parameters of radon in
solids by plastic track detectors

705 The role of nuclear track filters in radon measurements

709 The application of the Karlsruhe radon diffusion chamber in
sub-surface uranium exploration

713 Measurement of the relative efficiencies between plastic nuclear
track detectors (LR-115 and CR-39) and K0 Ilford nuclear emul-
sion for the detection of radon and daughters alpha radio-
activity in air

717 Experiences with track etch detectors for radon measurements

721 A radon personal dosimeter for miners

725 Routine use of cellulose nitrate films for the dosimetry of under-
ground miners in France

731 Time-integrated radon measurements in spring and well waters by
track technique

735 The performance of different types of etched-track radon dos-
imeters in two international intercomparisons

739 Calibration of radon detectors

743 Calibration of radon detectors in simulated natural environment

747 Use of cellulose nitrate as radon and radon daughters detectors for
indoor measurements

751 Results of natural radon daughter exposure measurements by using
alpha dosimeters, in western individual houses of France

755 The use of open track films for ^{222}Rn -measurements in dwellings

759 Indoor radon measurements with Kodak track film—some results

763 Measurements of radon in dwellings with CR-39 track detectors

767 Natural radioactivity in Mexican building material by SSNTD

SESSION IV: APPLICATIONS TO BIOLOGY AND RADIOPROTECTION

IV. 4. Measurement of fissile elements and alpha emitters

CHAIRMAN: G. CAMPOS-VENUTI

Invited Paper

W. R. ELLIS

N. LAL, P. K. SHARMA,
K. K. NAGPAUL, D. BEHERA
and S. K. MALIK

A. DANIŞ, D. DORCIOMAN
and A. PONTA

K. C. DAS, A. HANIFA and
T. D. GOSWAMI

N. P. SINGH, M. SINGH,
S. SINGH and H. S. VIRK

773 Advantages of solid state nuclear track detectors for the assessment
of alpha emitters and fissile elements

781 Uranium assay in various tobaccos using SSNTDs technique

785 Certified reference materials with uranium homogeneity on the
microscale

789 The uranium content in the blood of some vertebrates

793 Uranium estimation in Siwalik vertebrate fossil bones using SSTD

N. SEGOVIA, M. E. OLGUÍN
and M. ROMERO

SHI-LUN GUO, XIN-LU DENG,
SHENG-FEN SUN, WU MENG,
PENG-FA ZHANG and XIU-HONG HAO

E. PITT, A. SCHARMANN,
B. WERNER and M. SELTERS

L. JEANMAIRE, M. VERRY,
C. PITIOT and A. RANNOU

W. R. ELLIS

M. A. COLEMAN, C. BRIGHT,
D. L. HENSHAW and A. P. FEWS

D. L. HENSHAW, A. P. FEWS,
R. MAHARAJ and L. SHEPHERD

D. L. HENSHAW and A. WORLEY

WANG SCHICHENG and CUI HUANHUA

A. CECCHI, C. GORI and
G. ZATELLI

S. PORTAKAL

797 Studies of U in the blood of two population samples

801 Comparison between fission track method and laser-fluorometry
and fluorocolorimetry for determination of uranium concentration
in natural water

805 Estimation of uranium contamination in aluminium foils by CR-39
track detectors

809 Use of cellulose nitrate in radiotoxicology for measurement of
alpha low level activities in biological samples

813 The use of nuclear methods for the examination of coral samples
from Mururoa Atoll for plutonium content

817 Effects of radon diffusion on the microdistribution of alpha-active
nuclei recorded on CR-39 autoradiographs

821 Autopsy studies of the microdistribution of α -active nuclides in
lung tissue

825 The microdistribution of alpha-emitting particles in human bone

829 The energy measurement of alpha particles using CA SSNTD

833 On the determination of alpha activity in airborne particulate from
zircon sand using cellulose nitrate detectors

837 The separation of the americium from sea algae and measurement
of the activity by solid state nuclear track detector

SESSION V: APPLICATIONS TO EARTH SCIENCE AND DATING

V. 1. Earth science

CHAIRMAN: D. B. ISABELLE

K. THIEL and HU RUIYING

J.-C. PETIT, C. BROUSSE,
J.-C. DRAN and G. DELLA MEA

J.-C. DRAN and J.-C. PETIT

A. CHAMBAUDET, M. MARS,
M. REBETEZ and F. THEOBALD

A. CHAMBAUDET, M. MARS and
M. REBETEZ

I. J. M. AL-KHALIFA and
S. A. DURRANI

M. S. KHALIFA and S. A. DURRANI

N. SEGOVIA, S. DE LA CRUZ-REYNA,
M. MENA, M. ROMERO,
J. L. SEIDEL, M. MONNIN,
E. MALAVASSI, J. BARQUERO,
E. FERNANDEZ, G. AVILA,
R. VAN DER LAAT, L. PONCE
and G. JUAREZ

S. DE LA CRUZ, D. B. ISABELLE,
M. MENA, M. MONNIN, M. ROMERO,
N. SEGOVIA, J. L. SEIDEL,
P. PIALOUX and M. A. ARMIENTA

M. SINGH, N. P. SINGH,
S. SINGH and H. S. VIRK

843 The particle track record of the H5-chondrite "Jilin"

847 Use of fission tracks for deciphering the dissolution mechanism of
silicate glasses

851 Etching of fission tracks in silicate glasses by means of deionized
water

855 Chemical etching and length distribution of fission tracks: a model

859 A comparison of different external detectors for fission track dating
of apatite

863 Study of radiation damage in mineral epidote using nuclear track
and thermoluminescence (TL) methods

867 Fission tracks and thermoluminescence (TL) properties of natural
sphene crystals

871 Radon variations in active volcanoes and in regions with high
seismicity: internal and external factors

875 Radon emanation related to geothermal faults

879 Radon survey for uranium prospection using alpha detectors

N. P. SINGH, M. SINGH,
S. SINGH and H. S. VIRK

T. WALL

883 Uranium and thorium analysis in geological samples using plastic track detectors

887 Use of an alternative neutron dosimetry standard for fission track dating

SESSION V: APPLICATIONS TO EARTH SCIENCE AND DATING

V. 2. Dating

CHAIRMAN: G. ESPINOSA

J.-C. PETIT, J.-C. PARNEIX
and J.-C. DRAN

G. POUPEAU, R. BAITELLI,
M. BERBERT, G. BIGAZZI,
A. FONSECA and J. C. HADLER

C. BERNARDES, G. BIGAZZI,
F. P. BONADONNA, E. CENTAMORE,
C. M. G. LATTES and J. C. HADLER

S. R. HASHEMI-NEZHAD and
S. A. DURRANI

T. D. MÄRK, W. RITTER,
S. SCHÖPF and H. J. KOARK

S. SANZELLE, J. FAÏN
and D. MIALIER

A. S. SANDHU, S. SINGH,
S. K. MODGIL and H. S. VIRK

K. JAMES and S. A. DURRANI

S. SINGH, D. SINGH, A. S. SANDHU,
G. SINGH and H. S. VIRK

893 Etching of low energy (< 10 keV/amu) heavy ion tracks in minerals: implications for possible α -recoil track dating

897 On the reproducibility of apatite fission-track plateau-age dating

901 Fission track dating on glass from "Flysch della Laga" formation—a very interesting and problematic application

905 Determination of fission track age of uranium-bearing veins in a biotite sample from Bancroft, Canada

909 Studies on the Lower Seve Nappe at Mount Areskutan, Sweden, using the fission track temperature age method

913 Theoretical and experimental study of alpha counting efficiency using LR-115 Kodak SSNTD applied to dosimetry in the field of thermoluminescence dating

917 Track annealing studies in some micaceous minerals

921 Fission track closure temperatures

927 A study of track etch anisotropy in apatite

SESSION VI: TECHNOLOGICAL APPLICATIONS

VI. 1. Applications to radiography, microanalysis etc.

VI. 2. Applications to fission and nuclear technologies

VI. 3. Nuclear track microfilters

CHAIRMAN: H. A. KHAN

R. ILIĆ, J. RANT, M. HUMAR,
G. SOMOGYI and I. HUNYADI

R. ILIĆ, V. MARINKOVIĆ,
M. NAJŽER and T. ŠUTEJ

J. RANT, A. LOOSE and R. ILIĆ

A. LOOSE, R. ILIĆ,
V. MARINKOVIĆ and M. NAJŽER

G. SOMOGYI, ZS. VARGA,
I. HUNYADI, K. FREYER and
H. CH. TREUTLER

M. M. DHAWAN

A. DANIŞ and E.-G. BADEA

F. H. RUDDY, J. H. ROBERTS,
R. GOLD, C. C. PRESTON,
L. S. KELLOGG, E. P. LIPPINCOTT
and W. N. McELROY

933 Neutron radiographic characteristics of MA-ND type (allyl-diglycol-carbonate) nuclear track detectors

937 Image quality factors of radiography with track-etch detectors

941 The use of radiographic techniques for contrast enhancement and indirect evaluation of relief autoradiographic images (lithographs)

945 Application of autoradiographic techniques for diffusion studies of nuclear fuel

949 Studies on nitrogen mapping by various CR-39 track detectors

953 Microanalytical estimation of boron and uranium in some semiconductors using solid state nuclear track detectors

957 Polymer thermoxidative degradation kinetics investigations by the fission track method

961 Light water reactor pressure vessel surveillance using reactor cavity solid state track recorder neutron dosimetry

P. M. EVANS, A. P. FEWS
and W. TONER

P. M. EVANS, A. P. FEWS
and W. TONER

WU RISHENG, CUI HUANHUA
and WANG SHICHENG

K. JAMIL, E. U. KHAN,
SHI-LUN GUO, R. DERSCH,
P. VATER, R. BRANDT,
K. R. SPURNY and W. MÖLTER

R. BRANDT, R. DERSCH,
W. RUDOLPH, W. SCHMELZER
and P. VATER

M. BERNDT, J. KRAUSE,
G. SIEGMON and W. ENGE

965 Energy loss of charged nuclear particles in hot plasma

969 Measurement of Rayleigh–Taylor instability in laser accelerated foils

973 The research of microscopic structure of nuclear track pore

977 Filtration properties of mica track microfilters to be used in an industrial aerosol measuring instrument

981 Industrial applications of mica track microfilters

985 Investigation on a modified CR-39 microfilter

xxvii Author Index

xxxi Subject Index

